Idaho National Engineering & Environmental Laboratory
Bechtel BWXT Idaho LLC.

ADVANCED TENSIOMETER

Summary:
The advanced tensiometer is a tensiometer that can be installed deep within a subsurface monitoring well at depths far beyond the operational limits of ordinary tensiometers. The design allows for the measurement of unsaturated zone hydraulic head to determine unsaturated flow conditions. Direct cost savings from this deployment cannot be calculated, but deployment of the advanced tensiometer will yield significantly improved understanding of vadose zone groundwater flow and contaminant transport beneath the Idaho Nuclear Technology and Engineering Center (INTEC) and the influence on recharge to waters of the adjacent Big Lost River. Information developed by the availability of these data will yield very large savings in the remedial actions contemplated for WAG #3, Group 4. The selected remedy for Group 4 is a contingent remedy. If it can be confirmed that the perched water has dried up, then additional remedial actions will be deemed unnecessary.

This deployment helps to satisfy STCG need ID-6.1.27 (Integrated Suite of In Situ Instruments to Determine Flux in the Vadose Zone) and ID-S.1.11 (Monitoring of Flow and Transport in the Vadose Zone).

Qualitative Benefit Analysis		
Programmatic Risk	●	A remedial action decision for the INTEC WAG 3, Perched Water Remedial Action is required in 2007. The primary decision required is whether additional recharge controls are necessary for the Big Lost River adjacent to the INTEC site to prevent contaminant migration to the aquifer. Application of the advanced tensiometer and the resulting improvements in our understanding of moisture migration in the subsurface at INTEC will play a significant role in the decision-making process for the WAG 3 Perched Water Remedial Action. Improvements in the site conceptual model afforded by the technology deployment will reduce uncertainties in the selection of remedial action alternatives and reduce the risk of selecting inappropriate or less than optimum actions. Costs for the Perched Water Remedial Action are estimated to potentially be as high as $259M (WAG 3, OU3-13 ROD, October 1999). Potential cost savings through selection of optimum remedial actions could be significant.

Technical Adequacy	●	Other tensiometer designs can only be installed in the shallow subsurface (less than 20 ft below land surface). The new design allows for the installation of the advanced tensiometer at depths of as much as 400 ft below land surface in this deployment. Further, through use of electronic pressure transducers, continuous head measurements are available, making the evaluation of short-term, transient recharge events possible in the deep vadose zone. This is a significant advancement in our understanding of deep moisture migration, which is also critical to our understanding of contaminant migration.
Safety	○	Safety is not impacted through the use of this technology.
Schedule Impact	○	Schedule is not impacted through the deployment of this technology.

●	◒	○	◓	◉
Major Improvement	Some Improvement	No Change	Somewhat Worse	Major Decline

Quantitative Benefit Analysis		
Cost Impact Analysis	A quantitative cost impact analysis is not available for the deployment of this technology. Potential cost savings through selection of optimum remedial actions could be significant.	
	Annual Savings	NA
	Life-Cycle Cost Savings	NA
	Return-On-Investment (ROI)	NA

COST SAVINGS SPREADSHEETS ARE NOT APPLICABLE.

SCIENCE AND TECHNOLOGY BENEFIT ANALYSIS
DEPLOYMENT APPROVALS

Technology Deployed: ADVANCED TENSIOMETER

Date Deployed: 01/16/01

EM Program(s) Impacted: Environmental Restoration Program

Approval Signatures

Lee Sondrup 8/21/01

Contractor Program Manager Date

N/A

Contractor Program Manager Date

Kathleen E Hain 8/23/01

DOE-ID Program Manager Date

N/A

DOE-ID Program Manager Date